GOVERNMENT OF INDIA
MINISTRY OF NEW AND RENEWABLE ENERGY
LOK SABHA
STARRED QUESTION NO. 398
ANSWERED ON 20/08/2025

RESEARCH AND INNOVATION IN RENEWABLE ENERGY TECHNOLOGIES

*398. SHRI RAJESH VERMA
SHRI NARESH GANPAT MHASKE

Will the MINISTER OF NEW & RENEWABLE ENERGY be pleased to state

(a) whether the Ministry supports research and innovation in solar, wind, hydrogen energy and storage technologies and if so, the details of key institutions involved therein;

(b) the focus areas for next-generation clean energy development including Artificial Intelligence (AI) and automation;

(c) whether partnerships with startups, academia and international collaborators are being encouraged and if so, the details thereof; and

(d) the manner in which skill development initiatives are being integrated to train youth in the renewable energy sector and thus enhance India's leadership in global energy innovation and green jobs?

ANSWER

THE MINISTER OF NEW & RENEWABLE ENERGY AND CONSUMER AFFAIRS, & FOOD AND PUBLIC DISTRIBUTION

(SHRI PRALHAD JOSHI)

(a) to (d) A Statement is laid on the Table of the House.

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STATEMENT

STATEMENT REFERRED TO IN REPLY TO LOK SABHA STARRED QUESTION No. 398 for ANSWER ON 20.08.2025

(a) Yes. The Ministry of New and Renewable Energy (MNRE) is implementing a "Renewable Energy Research and Technology Development Programme (RE-RTD)" through various research institutions and industry to develop indigenous technologies and manufacturing for widespread applications of new and renewable energy including solar, wind, and storage technologies in efficient and cost-effective manner. Hydrogen research is being carried out under the National Green Hydrogen Mission (NGHM).

The key institutions involved at present with the Ministry for carrying out research include National Institute of Solar Energy (NISE)-Gurugram, National Institute of Wind Energy (NIWE)-Chennai, National Institute of Bio-Energy (NIBE)-Kapurthala, Indian Institute of Technology (IIT)-Bombay, IIT Madras, IIT-Roorkee, IIT Kanpur, IIT-Ropar, IIT BHU, CSIR-National Physical Laboratory (NPL), CSIR-Central Electrochemical Research Institute-Karaikudi, CSIR-National Chemical Laboratory-Pune, International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI), and other leading R&D organizations.

(b) Major focus areas for research and development of next-generation clean energy are as follows:

- High-efficiency and low-cost solar PV cell and modules
- New and Innovative solar PV applications such as Agro PV, Floating PV and BIPV
- Solar thermal, solar cold storage
- Innovative Solar Rooftop Projects under PM Surya Ghar: Muft Bijli Yojana
- Advanced hydrogen production, storage and utilization technologies
- Alternate chemistries for development of sodium-ion, flow batteries, solid-state batteries etc.
- Circularity in Renewable Energy Technologies: Batteries and Solar Photovoltaic
- Offshore wind technology and hybrid systems
- Advanced Bioenergy & Waste-to-Energy systems
- Geothermal Energy
- Artificial Intelligence (AI) and automation for Renewable Energy

(c) Yes, the research is being conducted in close coordination with Academia, startups, and international organizations under RE-RTD programme and NGHM. Apart from this, several other organizations are also working in the field of renewable energy in collaboration with leading academic institutions, international collaborators and startup such as Department of Science & Technology (DST), CSIR, IIT Madras Research Park, etc.

(d) MNRE is implementing following capacity building and skill development programmes to create skilled workforce for design, installation, operation & maintenance etc. of Renewable Energy projects to facilitate employment opportunities for youth:

i. Skill development programmes such as Suryamitra (Solar PV Technician), Varunmitra (Solar Water Pumping Technician), Vayumitra (Wind Power Plant Technician) and Jal-Urjamitra (Small Hydro Power Plant Technician) are being implemented under Human Resource Development Programme.

ii. Under Prime Minister Surya Ghar Muft Bijli Yojana (PMSGMBY), to build capable local expert workforce for installation/design/O&M for solar roof top systems throughout the country, trainings for the Technicians/ Electricians/ Installers/ Engineers/ Supervisors / vendors / trainers are being imparted through Directorate General of Training (DGT), National Institute for

Entrepreneurship and Small Business Development (NIESBUD), National Institute of Solar Energy (NISE), and Skill Council of Green Jobs (SCGJ) etc.

iii. Skilled manpower for Green Hydrogen Sector is being created through a scheme on skilling, up-skilling, and re-skilling under National Green Hydrogen Mission (NGHM).

iv. Skill Council of Green Jobs (SCGJ), a sector Skill Council under Ministry of Skill Development and Entrepreneurship is also providing trainings and certifications in Renewable energy under Pradhan Mantri Kaushal Vikas Yojana (PMKVY), Suryamitra Skill Development Program & other Schemes.

These efforts enhance India's leadership in global energy innovation and green jobs.

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